Prototype of Over Dimension Over Loading (ODOL) Freight Transportation Monitoring System Based on Arduino Mega 'Sabrang': A Case Study in Klaten, Indonesia

Authors : Chairul Fajar, Muhammad Nur Hidayat, Muksalmina

Abstract : The issue of Over Dimension Over Loading (ODOL) in Indonesia remains a significant challenge, causing traffic accidents, disrupting traffic flow, accelerating road damage, and potentially leading to bridge collapses. Klaten Regency, located on the slopes of Mount Merapi along the Woro River in Kemalang District, has potential Class C excavation materials such as sand and stone. Data from the Klaten Regency Transportation Department indicates that ODOL violations account for 72%, while non-violating vehicles make up only 28%. ODOL involves modifying factory-standard vehicles beyond the limits specified in the Type Test Registration Certificate (SRUT) to save costs and travel time. This study aims to develop a prototype 'Sabrang' monitoring system based on Arduino Mega to control and monitor ODOL freight transportation in the mining of Class C excavation materials in Klaten Regency. The prototype is designed to automatically measure the dimensions and weight of objects using a microcontroller. The data analysis techniques used in this study include the Normality Test and Paired T-Test, comparing sensor measurement results on scaled objects. The study results indicate differences in measurement validation under room temperature and ambient temperature conditions. Measurements at room temperature showed that the majority of H0 was accepted, meaning there was no significant difference in measurements when the prototype tool was used. Conversely, measurements at ambient temperature showed that the majority of H0 was rejected, indicating a significant difference in measurements when the prototype tool was used. In conclusion, the 'Sabrang' monitoring system prototype is effective for controlling ODOL, although measurement results are influenced by temperature conditions. This study is expected to assist in the monitoring and control of ODOL, thereby enhancing traffic safety and road infrastructure.
Keywords : over dimension over loading, prototype, microcontroller, Arduino, normality test, paired t-test
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